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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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PRELIMINARY REPORT ON CERTAIN TOMATO LINES, SELECTIONS AND VARIETIES, UNDER OBSERVATION AT THE MISSISSIPPI TRUCK CROPS BRANCH STATION[1]

H. H. Foster

The development of new disease-resistant tomato lines and varieties, with commercial quality, is under way at Experiment Stations in practically all States where tomatoes are grown commercially. In addition, several large commercial companies are carrying on similar work, independent of or in cooperation with Experiment Stations.

Several Experiment Stations are well along with their breeding program, especially in regard to disease resistance. Consequently it seemed worth while to test some of these unnamed lines under Mississippi conditions. During 1943 and 1944, 53 tomato lines, including 2 recently named varieties, were obtained from 5 different Experiment Stations, Federal and State. In addition, 14 named varieties, mostly small-fruited types, were tested along with Rutgers and Pan America. These lines and varieties were field tested in the spring of 1944. The more promising original lines, along with some additional lines and selections, were included in the fall test plot of 1944.

Tomato Diseases Serious in Mississippi in 1944. At least 7 tomato diseases were present in the Copiah County area during 1944, as previously reported (PDR 28 (30): 940-944. 1944). Several of these diseases were important factors in the general low yield and poor quality crop during the past season. With several diseases occurring in epidemic form, the past season provided an excellent opportunity to observe and select tomato lines showing disease resistance. This was especially true of 2 leaf blights caused by fungi (Alternaria solani and Septoria lycopersici). Fusarium wilt (F. [oxysporum f.] lycopersici] infection, on highly susceptible lines, was obtained by setting plants in a field known to be heavily infested with the fungus, also by inoculating plants in the greenhouse. Disease data are given in Table 1, while data regarding plant and fruit types are given in Table 2.

Federal Lines. Seven lines, from the Vegetable Breeding Laboratory, Charleston, South Carolina, were observed for reaction to wilt and leaf blights. Four lines appeared to be highly resistant to wilt, and all of the Federal lines indicated some resistance to or tolerance of leaf blights. One line appeared to be quite resistant.

Additional Federal lines were received, also selected, during the summer and were included in the fall test. Twenty-six lines were observed for plant and fruit type. Twenty-one lines showed good foliage; 23 lines set fruit rather abundantly, but only 5 lines produced medium- to large-sized fruit. All lines produced fruit with relatively good shape. The principal value of these lines, at the present time, is as breeding stock to cross with present commercial varieties.

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[1]Contribution from the Truck Crops Branch Station, Mississippi Agricultural Experiment Station, State College, Mississippi. Published with the approval of the Director, Mississippi Agricultral Experiment Station. Paper No. 99, New Series

Indiana Lines. Eleven lines were received from the Indiana Station and observed for wilt and leaf blight reaction. All lines were resistant to wilt, 6 lines showing high resistance, and 5 lines moderate to slight resistance. One line, in particular, appeared moderately resistant, and one line appeared slightly resistant, to the leaf blights.

A total of 23 lines and selections were observed, as to foliage and fruit type. Seventeen lines produced rather good foliage, 15 lines showed a good set of fruit, but all lines produced fruit small to medium in size. Twelve lines showed fruit of good shape, and all lines were in the class with Rutgers in maturing medium late to late in the season.

Missouri Lines. The Missouri Station furnished 22 lines for observation. In reaction to the wilt disease 15 lines were highly resistant, 6 lines moderately to slightly resistant, and 1 line susceptible. These lines were tested for wilt reaction under both greenhouse and field conditions. All lines proved to be very susceptible to the leaf blights. The majority of plants lost most of their foliage by or before mid-season, resulting in many fruits showing sunscald.

The Missouri lines looked rather promising as to foliage and fruit type. With the exception of one line, the foliage at the beginning of the season looked good. Twenty-three lines and selections out of 33 showed a good set of fruit, and 14 lines produced medium- to large-sized fruit. Twenty-six lines produced well-shaped fruit, and all lines came in the late to medium class with respect to maturity.

Nebraska Lines. A total of 5 lines, including 2 recently named varieties, Red Cloud and Sioux, were received from the Nebraska Station. From preliminary tests all lines appeared rather susceptible to both wilt and leaf blights. Owing to early defoliation much of the fruit was injured from sunscald during the spring season. This did not occur during the fall crop.

During the spring season additional selections were made, thus increasing the total number to 24. Only 12 lines and selections showed good foliage when compared with the Rutgers variety. All lines set fruit rather abundantly, though only 7 produced medium- to large-sized fruit. The majority of lines (21) produced smooth, well-shaped fruit. The fruit from 16 lines matured rather early, while 8 lines matured somewhat later. Nearly all Nebraska lines produced a rather meaty type of tomato; this was especially true in the fall crop. Several lines showed some promise in the fall test plot, indicating the possibility of, at least, a productive home garden type.

Ohio Lines. Eight lines were received from the Ohio Station. All showed either high or moderate resistance to Fusarium wilt. Only 2 lines, however, suggested tolerance of or slight resistance to the leaf blights.

Through additional selections the Ohio lines were increased to 13. Ten lines showed good foliage, early in the season. Nine lines produced a good set of fruit, with 7 lines showing medium to large tomatoes. Only 5 lines showed moderately smooth fruit. In most lines the fruit tended to be somewhat rough and irregular. All lines, with one exception, matured medium late in the season.

Mississippi Lines. Seven lines developed at this Branch Station were observed for their reaction to wilt and leaf blights. Five of these

Table 1. Disease reaction of certain unnamed tomato lines and commercial varieties of tomato, Crystal Springs, Mississippi, 1944

Seed source	Total lines and selections tested	Reaction to disease: Fusarium wilt: Resistant: Highly resistant	Fusarium wilt: Resistant: Moderate to slight	Fusarium wilt: Susceptible	Leaf blights Alternaria and Septoria: Resistant: Moderate	Leaf blights Alternaria and Septoria: Resistant: Slight	Leaf blights Alternaria and Septoria: Susceptible
U. S. Regional Vegetable Breeding Laboratory, Charleston, S. C.	7	4	2	1	1	6	0
Indiana Exp. Sta. Dept. Plant Path.	11	6	5	0	1	1	9
Missouri Exp. Sta. Dept. Plant Path.	22	15	6	1	0	0	22
Nebraska Exp. Sta. Dept. Hort.	5	0	0	5	0	0	5
Ohio Exp. Sta. Dept. Plant Path.	8	4	4	0	0	2	6
Mississippi Truck Crops Station	7	5	1	1	0	0	7
Commercial	Rutgers	0	+	0	0	0	+
Commercial	Pan America	+	0	0	0	0	+
Commercial (other named varieties	14	0	0	14	0	0	14

Table 2. Observations regarding foliage and fruit type of certain unnamed lines and commercial varieties of tomato, Crystal Springs, Mississippi, 1944

Seed source	Total lines and selections observed[a]	Plant type and foliage		Fruit								
				Set		Size		Shape		Maturity	
		Fair to good	Poor	Fair to good	Poor	Medium to large	Small to medium	Smooth and rounded	Rough	Early	Medium to late
U. S. Regional Vegetable Breeding Laboratory, Charleston, S. C.	26	21	5	23	3	5	21	26	0	0	26
Indiana Exp. Sta. Dept. Plant Path.	23	17	6	15	8	0	23	12	11	0	23
Missouri Exp. Sta. Dept. Plant Path.	33	32	1	23	10	14	19	26	7	0	33
Nebraska Exp. Sta. Dept. Hort.	24	12	12	24	0	7	17	21	3	16	8
Ohio Exp. Sta. Dept. Plant Path.	13	10	3	9	4	7	6	5	8	1	12
Mississippi Truck Crops Station	13	12	1	13	0	0	13	12	1	5	8
Commercial	Rutgers	+		+		+		+			+
Commercial	Pan America	+		+		+		+			+
Commercial (other named varieties)	14	6	8	10	4	4	10	6	8	8	6

[a] Includes lines and selections observed during spring and fall. Additional lines received during summer and additional selections made during spring season.

lines indicated high resistance to the wilt disease, but little or no resistance to the leaf blights was observed.

During 1944, spring and fall, 13 station lines and selections were under observation. Twelve selections produced good foliage, and all showed a prolific set of fruit. All lines produced small- to medium-sized fruit, mostly well-shaped. Five lines matured relatively early while 8 lines matured somewhat later.

Rutgers and Pan America. The Rutgers variety is grown extensively in Mississippi for the "green-wrapped" trade, while Pan America, more recently introduced, has been grown by a few truckers in the Texas Valley and probably elsewhere. Under field conditions, Rutgers is moderately resistant to wilt, and only in severely infested soil does it show severe wilt symptoms before late in the field season. Pan America is highly resistant to the wilt disease. Both varieties appeared susceptible to the leaf blight diseases.

Both Rutgers and Pan America normally produce abundant foliage and generally set a fair crop of fruit. Under Mississippi conditions Pan America does not set a uniform large-fruited crop of tomatoes. However, this variety is being improved by several Experiment Stations as well as commercial companies. It seems probable that in the future Pan America may enter the commercial field along with the Rutgers variety.

Other Named Varieties. Fourteen additional named varieties were under observation, all appearing rather susceptible to wilt and leaf blights. These varieties, though of little commercial value in Mississippi, are useful in test plots when checking and comparing unnamed lines for resistance to these diseases.

Improved Varieties on the Way. There is little doubt but what better commercial varieties will be developed for the South, including Mississippi. With several stations now engaged in developing and improving tomato lines and varieties, both new and improved varieties may be on the market within a relatively few years.

MISSISSIPPI AGRICULTURAL EXPERIMENT STATION, TRUCK CROPS BRANCH STATION

CONDITION OF THE TOMATO PLANT CROP IN SOUTH GEORGIA

G. M. Stone

A survey was made of the tomato plant crop, about 8000 acres, in South Georgia during the period April 30 to May 5. With respect to the quality of plants grown and relative freedom from diseases, the crop is good. However, the unusually early spring has thrown the timing of plant harvest off schedule. In general, about half of the plants are shipped to the "Eastern Shore" section of New Jersey, Maryland, and Virginia between April 20 and May 10. The other half goes to the Middle West during the period from May 10 to June 5. This year the greater part of the plants intended for the Middle West market are ready or will be ready for harvest in advance of the setting season in that section.

Early blight (Alternaria solani) was found to be considerably less severe than last year. General but light infections of the disease were found in most fields of old plants. Harvest in these fields was about com-

plete. One 10-acre field was found in which the loss was 100%; the grower abandoned this field without harvesting it. Otherwise little to no blight was found in fields of young plants or in fields at the peak of harvest.

General but light infection by the rootknot nematode [Heterodera marioni] was found in 6 fields. While infection was light, loss to the growers was considerable since most buyers do not accept plants with rootknot. The greater part of the tomato plant crop is grown either in new ground, following peanuts, or in some cases following corn, or corn and velvet beans. Rootknot is seldom found in South Georgia following peanuts; it is found occasionally on new ground, and rather often it is found following corn, or corn and velvet beans. It was following corn and velvet beans that most of the rootknot noted in this survey was found.

Bacterial wilt (Phytomonas [Pseudomonas] solanacearum) was found in 4 fields comprising about 200 acres. The percentage of plants affected was possibly less than 1, but as is the case with rootknot, there is no tolerance for bacterial wilt.

Southern blight (Sclerotium rolfsii) was found to be causing severe damage in one small field and slight damage in one other.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

DISEASES ON CABBAGE AND LETTUCE IN SOUTH CAROLINA

Alton E. Prince

A survey of spring truck crop diseases was made in Charleston County between April 13 and April 17, with Dr. C. N. Clayton, Pathologist, and Dr. C. N. Barnes, Superintendent, of the South Carolina Truck Experiment Station. The principal crops seen were cabbage, lettuce, and potatoes [see preceding issue PDR for report on late blight and other potato diseases].

Cabbage. About 30 acres of cabbage were inspected carefully, and most were found to be in good condition, with only trace amounts of downy mildew (Peronospora parasitica), Alternaria leaf spot, and black rot (Xanthomonas campestris). However, 5 carloads of cabbage had been turned down on northern markets because of a decayed condition that seemed to have developed in transit since the cabbage had passed inspection at the shipping point. Fields in which these cabbages were grown were inspected with Dr. Clayton, who had already incubated portions of diseased heads and had found bacterial soft rot [presumably Erwinia carotovora] to be the most prevalent disease.

In the fields bacterial soft rot was found in many of the stumps, some of which were completely rotted, indicating that infection was present before the heads were cut. On some uncut heads, bacterial soft rot lesions were found on the lower leaves in contact with the soil, and in a few the bacteria had spread from such lesions through the leaf petioles into the stalks.

One grower interviewed had dumped a carload of cabbage before shipping because he had found soft rot to be present. Conditions in his field were similar to those described above. In this field the diseased heads occurred in small areas. A similar situation was observed in an adjacent lettuce field.

Lettuce. About 70 acres of head lettuce, in 5 fields, were inspected. The more important diseases present were downy mildew (Bremia lactucae) and drop (Sclerotinia sclerotiorum), while less important diseases observed were mosaic [virus], Septoria leaf spot (S. consimilis), rootknot (Heterodera marioni), and bacterial soft rot.

Downy mildew was present in all fields in amounts from a trace to 100%. One 25-acre field was nearly a 75% loss because of this disease. The field was adjacent to seed beds in which the plants were infected with downy mildew. According to Dr. Clayton, this is one of the most serious diseases confronting lettuce growers in the area.

Drop was present in many fields. Up to 50% loss was observed in one 10-acre field in which lettuce had been grown for the past several years. EMERGENCY PLANT DISEASE PREVENTION PROJECT

DISEASES REPORTED ON SMALL GRAINS

Except where noted, reports are of Emergency Plant Disease Prevention Project surveys.

DISEASES OBSERVED ON WHEAT AND OATS IN THE DELTA REGION OF MISSISSIPPI: A few rather large wheat fields were seen in Humphrey and Sunflower Counties. A heavy infection of leaf rust (Puccinia triticina) [P. rubigo-vera var. tritici] was found in 3 fields betweeen Hollandale and Belzoni. Light infection was observed in the other fields surveyed, which apparently were planted to a different variety although no accurate information that such was the case could be obtained. Trace amounts of loose smut (Ustilago tritici) were noted in all fields. Speckled leaf blotch (Septoria tritici) was generally distributed and infection appeared to be rather heavy in most fields. A species of Helminthosporium was found to be associated with leaf spots, intermingling with the Septoria disease.

Crown rust (Puccinia coronata) and loose smut (Ustilago avenae) were found in trace amounts in every one of the several oat fields surveyed. A considerable amount of anthracnose (Colletotrichum graminicolum) was noted in 2 large fields in Sunflower County. Leaf spot (Helminthosporium sp.) was found to be widely distributed, but only in trace amounts. An effort was made to find downy mildew (Sclerospora macrospora), particularly in the areas where it was reported a few years ago by Miles; however, nothing was found that resembled this disease as it was described.--Douglas C. Bain, Apr. 16-28

DISEASES ON WHEAT AND RYE IN OHIO: Several wheat fields between Columbus and Cincinnati were examined. Most plants were in the joint stage. Speckled leaf blotch was observed on the basal leaves in most of the plantings. In 2 fields lesions (presumably speckled leaf blotch) were developing on the upper leaves. In a planting near West Jefferson a trace of current season infection of leaf rust was observed.

A field of rye (cover crop in a peach orchard) near Shilo in Montgomery County was observed in which leaf rust (Puccinia rubigo-vera var. secalis) was estimated at 50% prevalence and 5% severity. No other diseases were noted.--Alvin J. Braun, Apr. 16-21

CONDITION OF WINTER WHEAT IN NORTHERN INDIANA: Unfavorable reports from growers and county agents regarding excessive yellowing, dying of leaves, and stunting of plants in several Northern Indiana counties, following favorable earlier information concerning the condition of winter wheat in these areas, prompted a survey during the 2 weeks ending April 28. Since wheat mosaic (virus) was known to occur in some sections in the northern third of the State, an opportunity was provided to compare fields of the Fairfield variety (mosaic-resistant) with susceptible varieties when growing on virus-contaminated soil.

In general, much of the wheat in northwestern counties such as Starke, Porter, and LaPorte, and in the tier of counties across extreme Northern Indiana from west to east, was light green or yellow. Individual fields also varied in height, averaging 4 to 5 inches in some and up to a foot or more in others, some of this perhaps being due to differences in planting time, in soils and their management, fertilizer practices, and prevalence of disease. A gradual improvement in color and stand was noted further south toward Lafayette, some 85 miles south of LaPorte. This improved condition was also apparent in other counties in the same general latitude of Tippecanoe County.

Several factors, working together or independently, are probably responsible for this abnormal condition of winter wheat in parts of Northern Indiana.

Nitrogen Starvation (physiological). Much of the chlorosis of wheat occurred in the northern sixth of the State where nearly 3000 or more acres of wheat are grown annually. This yellow or light green cast to wheat fields, many of which were in early jointing stages, has appeared in the last week or 10 days. Probably some of it can be attributed to nitrogen starvation following favorable growing conditions earlier in the Spring. Recent Northern Indiana weather has been wet, cloudy and cold, such that the normal activities of nitrifying bacteria in the soil have been halted, and as a result, nitrification has come to a standstill. Tests run by George H. Enfield, Purdue extension agronomist, on April 28, with stems of wheat from Northern Indiana counties showed little or no nitrate nitrogen. Two weeks earlier many tests showed nitrate nitrogen present.

Frost Injury. A number of fields were seen with leaves which had been frosted. From a distance, such plants could be mistaken for those in which no frost injury had occurred but which were deficient in nitrogen or otherwise showing symptoms of disease.

Mosaic (virus). Of 11 fields closely examined in Porter County, 4 showed definite mosaic symptoms (mottling of the leaves). In 22 acres of Purkof, the mosaic pattern was striking on leaves over large portions of the planting. The plants appeared somewhat stunted. This grower reported a nearby field of Fairfield, which he was trying for the first time (the field could not be reached for comparison because of road conditions), as definitely greener and thriftier. Some 98 acres of Fairfield in 4 fields being grown for seed certification were free from mosaic and growing well. In general, when mosaic fields in Porter County were located, the symptoms were apparent over most of the acreage. It appeared that mosaic was more widespread here than in some of the other Northern Indiana counties. One to 3 fields with mosaic symptoms were also noted in Starke, La Porte, Elkhart, and De Kalb Counties; also in Whitley, Huntington, Wabash, Miami, White, and Pulaski Counties. Symptoms were not so striking, however, as in Porter County and the infected plants were found only in small areas

within the individual fields.

Powdery Mildew (Erysiphe graminis var. tritici). Nearly one half of the 60 or more fields inspected were found infected with powdery mildew, prevalence ranging from a trace to 100% of the plants. On plants where growth was dense and lush owing to apparently richer soil in occasional small areas in some of these fields, intensity of the mildew was moderate to severe. This latter situation was not unexpected. On the other hand, in 10 of the 27 fields with powdery mildew, all plants throughout the fields were infected and intensity ranged from moderate to severe. In 2 of these fields only portions of the upper 2 leaves remained green and the plants were stunted and yellow. In the other severely infected fields, powdery mildew pustules were common on the lower stalks and leaves and considerable yellowing and dying of lower leaves had occurred. More of the severely infected fields were located on high ground, where the soil was a sandy loam, than on low ground. No doubt differences in varietal susceptibility to the physiologic race of the fungus accounted for some of the differences in reaction of individual fields.

Speckled Leaf Blotch (Septoria tritici). Traces were found on the lower leaves in at least half of the fields surveyed. In several fields, notably in Marshall, La Porte, and St. Joseph Counties, the lower 3 or 4 leaves were spotted and the leaves dying and yellowing from the blotches to the tip. In Cass County, in the southern part of the area surveyed, the spots with pycnidia were present on many of the leaves half way up the plants and accounted for much of the leaf dying reported from this area.

Leaf Rust (Puccinia rubigo-vera var. tritici). Occasional pustules occurred on the lower leaves in 10% of the fields. Only 2 fields were observed out of 60 (1 of 50 acres in Porter County, and 1 of 20 acres in St. Joseph County) in which prevalence was 100% and intensity moderate.

In Summarizing, it would appear that in Northern Indiana normal growth and development of winter wheat has been adversely affected by a combination of factors. Environmental conditions have been such as to hinder nitrification and favor the development of diseases such as powdery mildew and speckled leaf blotch. Frost injury has caused slight damage in some fields. Mosaic (when susceptible varieties have been planted on virus-contaminated soil) has also complicated the situation. That some losses have already occurred is apparent. A return to normal weather will undoubtedly improve the situation.--J. S. Tidd

DISEASES ON WHEAT IN MISSOURI: Additional surveys of winter wheat have been made in areas not previously visited this season, primarily to examine stands for the occurrence of wheat mosaic. Observations were made in various locations in Central Missouri with Dr. C. M. Tucker of the Botany Department and Dr. J. M. Poehlman of the Field Crops Department of the University of Missouri. Surveys were also made along a route extending from Central to Northwestern Missouri, south to the Kansas City area and eastward to Boone County.

Stands were generally in the joint stage of development, with a few late fields in the rosette to early joint stage in the northwestern counties.

Mosaic was found in fields in Boone, Callaway, Howard, Saline, Chariton, Carrollton, and Ray Counties. In general the infection appeared to be of a mild form and causing no apparent damage, although in a number of fields fairly intense mosaic patterns occurred in some affected plants. In only one stand did it seem likely that noticeable damage would result, with

scattered plants distinctly dwarfed and weakened that, in all probability, will not head. Prevalence varied from only a few scattered diseased plants to varying degrees of mottling on practically all plants. In De Kalb, Buchanan, Platte, and Clay Counties, fields were observed in which plants showed symptoms strongly suggestive of mosaic infection. However, the symptoms were not distinct enough to permit positive field diagnosis and the occurrence of mosaic in these counties therefore remains in doubt.

Leaf Rust was observed in all stands. In the northwestern area, infection was generally light and scattered. In the west-central and central areas, prevalence in most fields was 100% and the severity ranged from a few pustules on the lower leaves to instances in which the lowermost foliage showed up to 65% (USDA scale) infection and pustules were developing well up on the more recently developed foliage. There seems little doubt that leaf rust will continue to increase in severity. Should temperatures more nearly approaching the optimum for its development occur than have occurred during the past month, a damaging epiphytotic may yet develop in fields in which the disease has developed rather sparingly to date.

Speckled Leaf Blotch was also observed in practically all stands. In most fields the prevalence approached 100%, but the intensity of infection was generally light to moderate. This disease does not appear to be so severe this season as it was in 1944 and probably little damage will result.

Powdery Mildew was found in some fields throughout the area surveyed. It was limited chiefly to fields or portions of fields in which the plants had attained a very lush growth. The infections were generally heavy on the lower leaves and leaf sheaths and the organism was sporulating profusely. Should the conditions of high humidity continue, powdery mildew is likely to cause some damage in these fields.--T. W. Bretz, period ending May 5.

WHEAT DISEASES IN KANSAS: During the week of April 17 to 21 97 fields in 24 western and southern counties were examined. Rainfall has been short in the western and northwestern areas and adequate to abundant in the southern areas. It was found that spread of leaf diseases, including mainly Septoria speckled leaf blotch and orange leaf rust, has been only moderate during the past 30 days. In the central and southern areas this has probably been due to the prevailing cool weather, while in the western areas lack of moisture may have been an additional factor.

Leaf Rust. Orange leaf rust was found present in every county but not in all fields, particularly in the western areas. In the central and southern areas examined, more or less leaf rust was present in every field. The heaviest infection at present was found in early wheat in the south-central counties.

Certain heavily rusted fields were selected in the autumn and re-examined during March and April. In all such fields seen the spring infection with leaf rust was lighter than that seen in neighboring fields that were less severely infected in the autumn. Fields heavily fall-rusted showed a much larger proportion of dead, dry leaves at the bases of the stools. This may, in part, explain the lower proportion of leaf rust in these fields, as the lower leaves on which overwintering normally occurs in Kansas were apparently largely killed off by the heavy fall infection.

Fields moderately to heavily grazed during the winter show only traces of leaf rust now. In this case it appears that most of the leaves that

might have served to overwinter the rust pustules were eaten by the grazing animals.

In fields where leaf rust overwintered abundantly in Kansas the wheat was usually of vigorous growth with a high proportion of the leaves at the ground level remaining alive and green throughout the winter.

Speckled Leaf Blotch was present in practically every field seen. Some of the heaviest infections were seen in the northwestern areas.

Other Diseases. Leaf spotting of undetermined cause was seen in many fields. Some of this may have been due to species of Helminthosporium; much of it resembled bacterial leaf spot, although no exudate was seen.

A number of fields with vigorous, rank growth showed damage from powdery mildew, and in south-central counties some injury from green aphis (Toxoptera graminum) was seen.--C. M. Slagg

WEATHER CONDITIONS AND CEREAL RUST DEVELOPMENTS AT DENTON, TEXAS, APRIL 17: The excessively wet weather of the past 2 months continues. A total of 3.44 inches of rain was received during the first half of April. A measureable amount of precipitation occurred on 8 days, with heavy dews on the other days. Maximum temperature was 80° F and the minimum was 32°. Two heavy frosts occurred although little damage to vegetation was caused. The total precipitation since the first of the year is now more than 18 inches or more than half our expected annual. Practically no field work has been possible this month.

Small grains continue to suffer from the excessively wet soils. On the better drained areas grain is beginning to head. Leaf rust of wheat has not spread very much but crown rust [Puccinia coronata] of oats has developed very rapidly in experimental plantings on the station. Leaves of Fulwin oats are so heavily infected that they are drying up.

A second survey trip into the east part of the county yesterday failed to reveal any stem rust [P. graminis] of wheat. In fact, I was not able to find stem rust of oats in any field, except one reported previously where the disease had apparently overwintered. Crown rust infection was heavy on false wild oats (fatuoids) along the road and fairly heavy in fields of Fulghum. Some fields of Fultz wheat in that area are nearly fully headed. They have been seriously injured by leaf rust and especially by Septoria [tritici]. At this early date, leaves have dried up completely on from 1/3 to 2/3 of the plant. Although some fields look good from the road, the heads are extremely small when the field is examined. There is a wide range in maturity from these fully headed Fultz fields to fields of Tenmarq that are only 6 to 8 inches tall at this time. Variation in maturity of oats also is great and both crops present a favorable condition for the development of large amounts of rust inoculum.--I. M. Atkins, Division of Cereal Crops and Diseases

A WILT DISEASE OF CROTALARIA AND NOTES ON SOME OTHER DISEASES IN MISSISSIPPI AND LOUISIANA

Douglas C. Bain

Crotalaria is grown as a summer cover crop in tung groves in southern Mississippi and in the Florida Parishes of Louisiana. Crotalaria spectabilis is grown more extensively than other species, but since it is defi-

nitely known to be toxic to cattle, there is a tendency toward replacing it with C. intermedia in Mississippi. Few diseases of this crop are known to occur in these 2 States.

Wilt. During October 1944 wilted plants of C. intermedia were observed in a large tung grove near Poplarville, Mississippi. Affected plants showed various degrees of wilt, from early stages to plants completely dead. Vascular discoloration was evident in stem sections. Material was brought in to the laboratory at Louisiana State University for microscopic study and for culturing. Large hyphae were found in cross-sections of vessels from discolored tissue. Pieces of stem, from base to tip, were plated on oatmeal and potato-dextrose agar. Three fungi -- a Cephalosporium-like fungus, a sterile form, and a species of Fusarium -- were recovered in culture. The Fusarium was set aside because it obviously was a contaminant.

In November wilted plants of C. intermedia were found in a large tung grove near Covington, Louisiana. The Cephalosporium-like fungus was consistently recovered in pure culture from these plants.

Preliminary inoculation tests were set up to determine the relationship of this Cephalosporium-like fungus and the sterile form to the disease. The 2 fungi were cultured on a 1:1 oat-soybean mixture in flasks. The inoculum was mixed in sterilized soil in 6-inch pots, and seeds of C. spectabilis and C. intermedia were planted above the layer of inoculum. Two pots of each isolate (from Mississippi) were used for each species, and 2 were held as control. In about 4 weeks, plants inoculated with the Cephalosporium-like fungus began to show sudden wilting, and in about 2 more weeks all but a few were dead. The fungus was recovered from several of the wilted plants. Check plants and those inoculated with the sterile form remained healthy. These results indicated definitely that of the 2 fungi, the Cephalosporium-like form was pathogenic.

Two additional series of inoculation tests were run in which soybean variety L. Z., Crotalaria intermedia, C. spectabilis, C. striata, C. lanceolata, and C. grantiana were used. An original isolate of the wilt fungus from Louisiana and a reisolate (from preliminary tests) from Mississippi were used for inoculum. In both series, clear-cut results in Crotalaria were obscured by damping-off. The soybeans, however, germinated quickly and uniformly and were unaffected by damping-off fungi, and in a few weeks inoculated plants showed wilting and stunting.

In a third set of inoculations, C. spectabilis, C. intermedia, and soybean variety L. Z. were inoculated with both the Louisiana and Mississippi isolates. Wilting and stunting was again obtained.

These limited experiments indicated that the fungus is pathogenic not only to Crotalaria intermedia and C. spectabilis but also to soybean variety L. Z.

A careful study of the wilt fungus revealed an occasional 1- to 3-septate macrospore. Terminal and intercalary chlamydospores and bluish green sclerotia were also found in older cultures. These observations suggested that the fungus was probably a species of Fusarium. Tentatively, the organism was called F. bulbigenum var. tracheiphilum. A subculture was sent to Dr. W. C. Snyder, at the University of California, for identification. Dr. Snyder identified it as F. oxysporum and remarked that, "It could be the same fungus which under the Wollenweber system is called F. bulbigenum v. tracheiphilum, since F. bulbigenum is a synonym of our F. oxysporum."

Until further studies with Fusaria from Crotalaria, soybean, and cowpea are made, the identification can only be tentative.

A limited search through the literature revealed no record of a wilt of Crotalaria in this country. In Africa and India, however, there have been several reports of wilt diseases on C. juncea and C. striata. Various species of Fusarium (F. udum, F. vasinfectum, F. semitectum, F. semitectum var. majus, and undetermined species) were reported to be the causal agents. A Fusarium wilt of C. juncea was reported in Saigon. Some of the Indian reports indicated a considerable loss in tonnage of green manure due to the disease.

Stem Spot. In September, approximately an acre of thickly-sown Crotalaria was examined at the Stoneville Experiment Station near Leland, Mississippi. Although the stand appeared to be heavy and the plants to be in a healthy condition, fully 10% of the plants were affected and had been killed by a basal stem spot, occurring as somewhat depressed zonate lesions from 1 to 4 cm long, partially or completely encircling the stem from 2 to 6 inches above the ground. In many instances, a light brown or whitish mycelial fan extended out from the necrotic tissue onto the apparently healthy epidermis. Occasionally on green stems, areas of white, appressed, fuzzy mats were observed at about the same height. Basidiospores were found on the mats and Dr. S. J. P. Chilton identified the fungus as Corticium vagum [Pellicularia filamentosa]. For the present, this fungus is considered to be the cause of the stem spot. Many plants in various stages of wilting showed lesions on the stems.

In October the same disease was observed in the area between Poplarville, Mississippi, and Bogalusa, Louisiana.

Stem Canker. In October, in the area near Franklinton in Washington Parish, Louisiana, a stem and branch canker had caused evident damage to Crotalaria spectabilis. A species of Rhizoctonia was found to be associated. The disease appears to be entirely different from the stem spot reported above. The lesions do not have a zonate appearance, the epidermis is rotted off thus leaving the vascular strands exposed, and the disease is not confined to the basal portion of the stem, but occurs higher up on the stem, as well as on the branches.

Powdery Mildew. In October, powdery mildew (Oidium erysiphoides var. crotalariae) was very common and abundant in Louisiana near Franklinton, and appeared to be generally distributed throughout Pearl River County, Mississippi, on Crotalaria spectabilis.

Leaf Spot. A relatively small amount of leaf spot on middle and lower leaves in Pearl River County, Mississippi, apparently was responsible for some premature shedding of the leaves observed at the end of August. A species of Cercospora was associated with one type of spot, and a fungus tentatively identified as Pyrenochaeta sp. with another. It is possible that the latter fungus follows the Cercospora.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

REPORTS ON ALFALFA DISEASES

BLACK STEM AND DOWNY MILDEW IN PENNSYLVANIA: A serious outbreak of black stem disease has occurred in Southeastern Pennsylvania this spring. From May 2 to May 5, it was found in Dauphin, Lebanon, Berks, Lehigh, Northampton, and York Counties. It was present in all fields visited and in some fields it severely injured large areas. The fungus (Ascochyta imperfecta) was found to have infected all plants in many areas.

In about one-fourth of the fields, downy mildew (Peronospora trifoliorum) was beginning to appear.--R. S. Kirby, Pennsylvania State College.

DOWNY MILDEW AND BACTERIAL WILT IN KANSAS: Downy mildew was present and sporulating in all first year stands. Bacterial wilt (Corynebacterium insidiosum) was seen in all old stands in greater or lesser amounts. In Barber, Harper, Sumner, and Sedgwick Counties very heavy infestations of the pea aphis (Macrosiphum pisi) will cause losses ranging up to 90% in the first cutting.--C. M. Slagg, Emergency Plant Disease Prevention Project. Apr. 17-21

REPORTS ON DISEASES OF FRUIT CROPS

APPLE SCAB DEVELOPMENT IN MASSACHUSETTS: No new infections of scab (Venturia inaequalis) have appeared yet on unsprayed McIntosh check trees in the College orchard. This means that either too few spores were mature during the wet period of April 2, or the trees were not wet long enough at the prevailing temperature (about 55°F). Since the old leaves and the trees were wet for about 20 hours, the scarcity of mature spores must have been the limiting factor. In fact, leaf examinations at the time indicated very few perithecia far enough advanced to discharge spores.

It is doubtful if the 14- to 15-hour wet period on April 4 and 5, with fruit buds in pre-pink, was long enough to permit scab infection (temperature about 45°), although there was a light spore discharge. Scab spots would appear around the last of April. The 24-hour wet period on April 17 and 18 at early bloom caused a moderately heavy discharge of ascospores and no doubt was favorable for infection of unprotected trees since the temperature averaged about 50°. Scab spots may be expected the first week of May. The heaviest spore discharge to date occurred during the wet period from noon on April 25 to about 8 A.M. on April 26, a 20-hour period at about 50°. McIntosh in Amherst was in late bloom. The 8-hour rainy period on the night of April 26 probably could be considered an extension of the preceding one for the interval between them was characterized by cool and cloudy weather with high relative humidity.

At present, following the favorable infection period of April 25 to 26, at least 1/2 to 2/3 of the ascospores are gone from the overwintered leaves.

Heavy spore discharges of both apple and quince rusts [Gymnosporangium juniperi-virginianae, G. clavipes] occurred during the recent rainy periods. --C. C. Boyd, Massachusetts State College.

DISEASES OF STRAWBERRY IN OHIO: During the period April 16 to 21, commercial strawberry plantings in Montgomery and Hamilton Counties in Southwestern Ohio were examined with H. L. Porter of the Ohio State Department

of Agriculture. During the past 10 years the strawberry acreage in these counties has decreased considerably because of frequent summer droughts and the shortage of field labor.

Most plantings were severely affected by the extensive drought during the summer of 1944. In general, the Blakemore variety appeared to be less severely affected by the drought than Premier, Pathfinder, Dorsett, or Catskill.

Red stele disease (Phytophthora fragariae) was observed in 3 of the 7 plantings visited in Hamilton County. Two of the plantings were practically 100% affected, whereas in the third planting only 20% of the plants were showing above-ground symptoms although considerably more were infected. No red stele was observed in the 8 plantings examined in Montgomery County.

A trace of leaf spot (Mycosphaerella fragariae) was observed in the majority of the plantings.

In 2 fields of the Blakemore variety June yellows (hereditary characteristic) affected about 2% of the stand.--Alvin J. Braun, Emergency Plant Disease Prevention Project

SCAB IN A CONNECTICUT VIOLET COLLECTION, WITH NOTES ON VARIETAL REACTION

Katherine Thaxter

Scab (Sphaceloma violae Jenkins) has been present in my violet collection at Washington, Connecticut since I started it in 1938. The disease was diagnosed as such only in 1941 when I sent specimens to the Agricultural Experiment Station at New Haven, Connecticut. There the identification was made by Dr. Florence A. McCormick; then, at her request, verified by Dr. Anna E. Jenkins of the U. S. Department of Agriculture, who had studied the disease. My correspondence with Dr. Jenkins since May 1942 furnishes a record of the disease in my violet collection.

On May 27, 1942 I wrote that, as had been the case each year, the plants were in excellent health. A few days later (June 4), however, the previous trouble, i.e. the scab, began to be visible. It seemed that the early appearance of the disease was brought on by the wet weather. This season (1944) the weather has been dry and little scab was visible in the violet collection, even by late July. An exception consists of a plant that I dug up from my woods because it was a handsome specimen with a fine large dark purple bloom (not Viola cucullata Ait.); in the collection this year this was so badly diseased that I had to destroy it.

There is no doubt that certain violets are more prone to scab than others. But from my observations it would seem than individual plants of the same variety possess a certain immunity. For example, in one bed of collected specimens of Viola cucullata some have the disease while others are perfectly clean. A healthy plant of this species selected because of its red blooms was introduced to this bed from my nursery. The plant withstood the scab long after the other plants in the bed had been attacked, but eventually also became affected.

In the case of Viola odorata Hort. var. Rosina, that very fragrant rose-colored variety, I have seen two plants in a garden a few feet away from each other, one badly affected with scab, the other perfectly clean.

Similarly, I have two separate beds of a hybrid form of V. papilionacea Pursh. The beds are about 8 feet apart and on opposite sides of the nursery. One bed is extremely diseased, the other almost healthy. I have examined violet plants, thousands of which are scattered over a friend's place nearby and here the disease is negligible, though I see traces here and there. In 1942 in a well-known rock garden in this State, I saw the disease on V. striata Ait., and later (September 1942 and 1944) observed it on this species in my own collection. It was on this species that the disease was particularly severe in Whetzel's garden at Forest Home, Ithaca, New York, in the early season of 1944 (cf. PDR 28: 770-771. 1944).

Besides the susceptible natives already mentioned, i.e. Viola cucullata, V. papilionacea, and V. striata, others are V. palmata L., V. saraea Hort., and certain unidentified kinds. Natives on which I have not observed the disease are V. britonniana Pollard, V. pectinata Bicknell, V. primulifolia L., and V. stoneana House, as well as various others as yet unidentified. On introduced violets I have found the disease on V. hederacea Labill., V. patrini Ging., and certain others, and of course, on the so-called greenhouse violets, V. odorata.

I began my collection exclusively with these "florist" violets, such as Princess of Wales, the Russians, the new "Sempervirens." These were soon attacked and when the disease got going it was like a scourge. Not knowing what the trouble was or how to deal with it, I had to destroy these particularly susceptible plants.

In the effort to control the scab in my collection I sprayed with colloidal sulfur and during the season of 1942 cut away the old leaves. This treatment reduced the disease. This particular trouble is obviously enhanced by a wet season; similarly the removal of beds to a less damp and more airy location definitely reduced the disease.

WASHINGTON, CONNECTICUT

DISEASES OF ROSELLE FIBER PLANTS IN EL SALVADOR

Otto A. Reinking

On instructions from Washington, D. C., through Mr. Simon B. Schwartz, special representative of the Board of Economic Warfare with headquarters in Guatemala, a special study was made of the diseases of roselle (Hibiscus sabdariffa var. altissima) in El Salvador, from January 16 through January 18, 1943, at the experimental grounds of the Servicios Técnicos de la Asociación Cafetalera de El Salvador at Santa Tecla, and at Cuyagualo on the plantations of Mr. W. Dalton. The writer is indebted to Mr. Héctor Herrara, president of the Banco Hipotecaria de San Salvador, to Mr. Felix Choussy, director of the technical department of the coffee station, and to Dr. J. Stern, pathologist of the station, for assistance in these studies.

This was not a satisfactory period for a study of disease, since it was at the peak of the dry season, also, at this time of the year, roselle plants have matured and for the most part been harvested. A small new irrigated planting made on December 27, 1942 contained small plants all of which were healthy. Because of the dry season and absence of diseased material for study, the comments made relative to the disease situation must be considered only preliminary. Further studies were outlined to be

conducted during the rainy season at the coffee station.

The following diseases were observed and studied provisionally during the visit: Cercospora leaf spot, an undetermined stem canker, Phoma leaf spot and canker, an undetermined pod and seed disease, and a Rhizoctonia rot of older stems. It has been thought that the troubles designated as Cercospora leaf spot, stem canker, and pod disease, were caused by the same fungus, but this study indicates that each is a separate disease. They are discussed separately below.

Cercospora Leaf Spot. In Mr. Choussy's report, "El Posible Implantamiento del Cultivo de la Roselle en El Salvador", the leaf spot was designated as due to an unidentified fungus. No leaf spotting was present in the plantings visited in January. Examination of dry material collected by Mr. Choussy in June of 1942, however, showed the presence of a Cercospora on the spots, and while only a few leaves were examined it is believed that this leaf spot is due to the Cercospora, since the spotting is characteristic of that caused by this fungus. Further examination is necessary in order to verify this determination. This leaf spotting probably will not be of great importance from a commercial standpoint. However, it has been reported from South America as serious during wet seasons.

The habit of growth of the organism makes it unlikely that it is the cause of the stem canker.

Stem Canker. Only a few cases of stem canker could be found on plants at the Santa Tecla station. Five infected plants were collected, which were about mature with somewhat dried-out cankers. Cankers collected from the mature plants on the Cuyagualo plantation of Mr. Dalton were in a very dry condition and not suitable for culture studies. Microscopic examination failed to show the presence of spores or fruiting bodies of any fungus that might have been the cause of the canker. Material was placed in a damp chamber for 36 hours and examined again with no better results.

Cultures were made on sterile corn meal from the less dried specimens collected on the experiment station at Santa Tecla. A report on the results from these isolations will be given later. (See Supplemental Report below).

The disease is characterized by the development of a canker on the stem, grayish yellow in the center with concentric gray rings and a reddish brown border. If it should become widespread it may be serious, for the canker girdles the stem, causing death of the upper parts of the plant and thereby reducing the fiber and seed production.

Phoma Leaf Spot and Canker. The Phoma leaf spot was described by Mr. Choussy and Dr. Stern (loc. cit.). It is not of a serious nature. A stem canker originating at the base of a pod, observed by the writer, was covered with the spore bodies of the Phoma (or Phyllosticta). Apparently this latter phase of the disease is not so prevalent as the leaf spot.

Pod and Seed Disease. A pod and seed disease characterized by death of the pods and some of the seeds within pods was observed. Mr. Choussy reported this trouble as reducing the seed production and suggested that if a fungus is the cause it may be spread by the seed. An examination of diseased pods and seeds failed to show the presence of a fungus. On pods placed in a damp chamber a Fusarium developed but it is believed that this fungus may be secondary. Further studies of this trouble are necessary to determine its nature definitely. My observation indicated that it was not

of fungus origin and for that reason there is probably no danger of seed dissemination, but further studies should be made to prove this point (But see also supplemental report below).

Rhizoctonia Rot of Older Stems. A few old, dead stems of almost mature plants collected on the station grounds at Santa Tecla on January 16 showed the presence of sclerotia of Rhizoctonia on the stems. This fungus may attack a large number of different plant species but is generally only of importance as a plant pathogen during the rainy season and in dense plantings. It could not be told whether the fungus is of any economic importance to roselle plantings. Its behavior during the rainy season should be watched.

Conclusion. Diseases of roselle may be of importance if they affect the size of plants and thereby reduce fiber production, or if they attack the pod and cause a seed decay. In the latter case seed production would be lowered and the danger of disease dissemination through seed could be present. It may be that the unidentified canker may cause some loss in fiber production. From reports this does not appear to be likely. While the fungus causing the trouble has not been identified it is not believed that any new fungus is concerned but that the disease is probably due to some ordinary stem canker producing fungus (see supplemental report below).

The seed pod and seed trouble did not appear to be due to a fungus. It was present in plants with the canker and may result indirectly from a weakening of the plant due to the stem canker (but see supplemental report below).

My observations did not indicate any danger of spread of a new disease. The Cercospora and Phoma leaf spotting fungi may be spread by being carried on the seed coat since the spores are scattered during the seed extraction process in the field. These leaf spotting fungi are widespread and it is believed will be found wherever roselle is grown. A Cercospora already has been reported on roselle from South America.

SAN SALVADOR, JANUARY 18, 1943

Supplemental Report: Culture Studies of Fungus Isolated from the Stem Canker

As indicated above (p. 412), material from stem cankers on 5 plants collected at the Santa Tecla experiment station, was plated on corn meal agar. The cultures were taken to Geneva, New York, for final determination. An examination of the plates on February 8, 1943, showed that a fungus developed in almost pure culture in the platings made from each of the 5 stem cankers. This fungus proved to be a species of Sclerotinia, along with which a species of Botrytis also developed. The Sclerotinia is characterized by the production of a mass of blackish sclerotial bodies. The Botrytis was produced in the same cultures, as a powdery gray-black mass of spore bodies produced from a mycelium of the same color. Species of Botrytis have been found to be the conidial stages of various Sclerotinias, and it may be that this is so with the roselle Sclerotinia. Further studies are needed to prove this point.

Because this Sclerotinia was isolated in almost a pure state from all 5 cases of roselle canker studied, it is believed to be the cause of the disease but again further studies are essential.

It is now believed that the inflorescence rot (pod and seed disease, see above, p. 412) may also be caused by this same fungus. No isolations were made from floral parts, so that further verification is necessary. The disease was reported to be most common on floral parts nearer the ground surface, often below the cankers found on stems. Since species of Sclerotinia, in general, are favored by dampness, one would expect more disease to appear near the ground at the base of the plants, where poor aeration and higher humidity are more apt to be present.

Sclerotinia may attack leaves also, producing, most commonly, blotches instead of distinct spots. It is possible that the Sclerotinia obtained in culture, if it is proved to be actually pathogenic to roselle, could produce a leaf blotch on roselle. This leaf blotch would be distinctly different from the Cercospora leaf spot described above (p. 412).

Sclerotinias are most active during periods of high humidity and poor aeration, such as would occur in densely planted areas. The fungus would be expected to be most severe during the rainy season and on succulent parts of the plant. It does not grow well under sunny, well-aerated conditions. If the disease should prove to be caused by this fungus, and is determined to be serious, a possible remedy would be to avoid too thick plantings by widening rows between plants and thereby provide for better aeration.

GENEVA, NEW YORK, FEBRUARY 11, 1943

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